

Supercritical flow in 45°- junction manhole

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Junction manholes in sewer systems are not yet designed according to a standard, such that their geometries may be subject to local variations. The present project involved a so-called simple junction manhole with a straight-through branch to which a 45° lateral branch was connected, with the sewer diameters D identical for the upstream, the lateral and the downstream branches. The radius of curvature of the lateral branch was equal to $3D$.



Fig. 1: Supercritical flow in 45° junction manhole

For supercritical upstream flow, various flow regimes may occur:

- Supercritical flow in all three branches,
- Lateral branch flow subcritical because of dominant upstream flow, and
- both lateral and upstream branch flows subcritical because downstream branch limits flow.

A significant question thus relates to the governing flow pattern for a given manhole configuration (Fig.1). Hydraulic model observations were thus conducted to answer this question in addition to the internal flow characteristics of these complex free surface flows.

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